VERA: Clean Driving Habits Guide

North Carolina Division of Air Quality

NC Air Awareness

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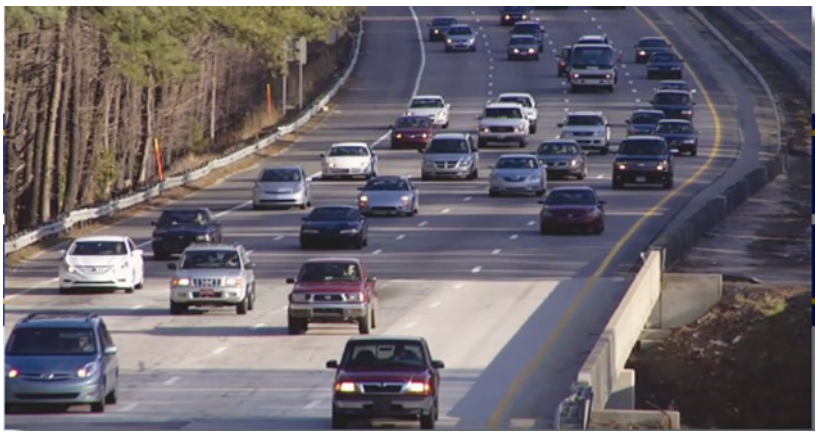


Glossary

CO: Carbon Monoxide

CO_2: Carbon Dioxide

DAQ: Division of Air Quality

DEQ: Department of Environmental Quality

EV: Electric Vehicle

ICE: Internal Combustion Vehicle

NO_x: Nitrogen Oxides

PM: Particulate Matter

VERA: Vehicle Emissions Reduction Activities

VOC: Volatile Organic Compounds

ZEV: Zero Emission Vehicle

The Facts

The United States has almost as many cars as people, with 816 cars per 1,000 people in 2014[1]. There are 3.3 million cars registered in North Carolina alone[2]. As the number of vehicles on the road and the number of miles driven by each person continues to grow, so does air pollution. The personal automobile is the **SINGLE GREATEST POLLUTER** in the U.S. and accounts for half of the CO_2 emissions and 82% of greenhouse gas emissions in the country. As a driver, you have the choice to purchase a fuel efficient, low emitting vehicle that meets your driving needs in order to have a positive impact on protecting air quality. Even if you already have a vehicle to drive, you can still decrease your individual emissions by keeping your car well-maintained and using efficient driving habits. These habits and techniques will reduce your vehicle emissions and help you to save money on fuel and emergency maintenance costs.

In addition to damaging the environment, air pollution also has negative impacts on human health. In North Carolina, the main air pollutants are ground ozone and particulate matter. They can irritate your lungs, respiratory system, and heart. Young children, older adults, and anyone with pre-existing respiratory or cardiac issues are more at risk for lasting health issues from air pollution. By making informed decisions when purchasing or driving your car, you can improve air quality to protect your health and the health of those around you.

[1] https://www.energy.gov/eere/vehicles/fact-962-january-30-2017-vehicles-capita-other-regionscountries-compared-united-states

[2] https://www.statista.com/statistics/196010/total-number-of-registered-automobiles-in-the-us-by-state/

Car Choice

When choosing a car, it is important to consider costs, reliability, fuel efficiency and personal preference. Many of us do not have the luxury of buying a new car as our first car. The following may help you choose the right car for you at the right price.

Fuel Efficiency

Fuel efficiency means how far a vehicle can travel on one gallon of gasoline or diesel fuel, also known as miles per gallon (mpg) or gas mileage. Vehicles that get better gas mileage pollute less. The air pollutants that are emitted from a traditional internal combustion engine (ICE) are: particulate matter (PM), nitrogen oxides (NO_X), volatile organic compounds (VOCs), carbon monoxide (CO) and carbon dioxide (CO_2).

You can compare vehicle gas mileage, environmental benefits and safety features at www.fueleconomy.gov[3]

Vehicle Type

When determining which type of vehicle to purchase, myriad options are available.

- Traditional ICE – combust gasoline or diesel fuel as an energy source.
- Hybrid – uses the car's braking system to create energy which is stored in a battery as "fuel". There is also an ICE as backup for when the battery is too low to run the car.
- Plug-in Hybrid - uses an electrical charging station to "fuel" the battery and has an ICE that is typically used as backup.
- Electric - powered solely by electric energy stored in the battery.

In 2018, NC Governor Cooper issued Executive Order 80 that included a goal of increasing the number of zero emission vehicles (ZEVs) operating in the state to 80,000 by 2025.

[3]Environmental Protection Agency. Accessed October 2019.

Electric vehicles (EVs) have no tailpipe emissions, in fact they have no tailpipe! Air pollution is offset from the car to the power plant though. Because of strict environmental regulations for air pollution however, less air pollution is emitted from a power plant, resulting in less overall pollution from an EV.

Purchase of EVs is on the rise across the nation. This is because the cost to buy an EV is decreasing, and overall, they cost less to drive and maintain as shown by a recent survey conducted by NC DAQ.

Annual Gasoline Cost	Annual Charging Cost	Cost Ratio	Required Fuel Economy
$1,066	$441	2.414	60.3mpg

All-electric vehicle
$133.49

Plug-in hybrid
$218.86

Gasoline vehicle
$375.42

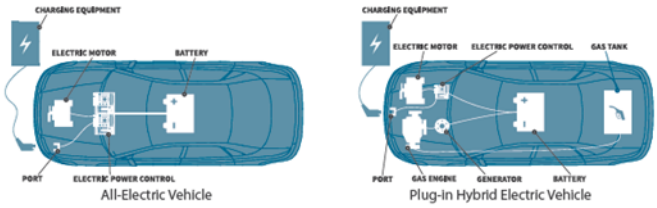
Price of maintenance per year of all-electric, plug-in hybrid, and gasoline vehicles.

"With a little planning, an EV can go anywhere."

"Range anxiety is a myth. You can also find a solution. Charging infrastructure is expanding every day. No maintenance and no problems."

"Smooth, quiet performance."

There is less maintenance for an EV because there are fewer moving parts; even a Plug-in Hybrid has fewer moving parts than an ICE[4].



All-Electric Vehicle
Plug-in Hybrid Electric Vehicle

[4]Plug-In NC. www.pluginnc.com Accessed October 2019.

Vehicle Maintenance

Sometimes you cannot control which car you drive or you have already purchased a vehicle. There are still ways that you can decrease air pollution while saving money. Keeping your car well-maintained can extend its life, increase resale value and improve fuel efficiency.

Gas Mileage

Gas mileage is important to consider when choosing a car, maintaining your car, and making choices about how to drive. When a vehicle has better gas mileage, it is able to travel farther on each gallon of gas. The result is that you use less gas, meaning less air pollution. Monitoring your gas mileage is a good indicator of your car's health. If you see your gas mileage becoming worse over time, then the car may need maintenance. By maintaining your vehicle properly, you are improving its efficiency and therefore increasing gas mileage. This improved efficiency will also result in saved money due to decreased gasoline consumption.

1 Gallon of gasoline[5] =
20 pounds CO_2

[5]https://www.fueleconomy.gov/feg/contentIncludes/co2_inc.htm

Maintenance Habits

Proper maintenance of a car's engine and emission control equipment is critical for vehicle performance and to reduce air pollution. Inspection/Maintenance (I/M) programs for cars and trucks makes sure that the air pollution controls on your vehicle are working properly.

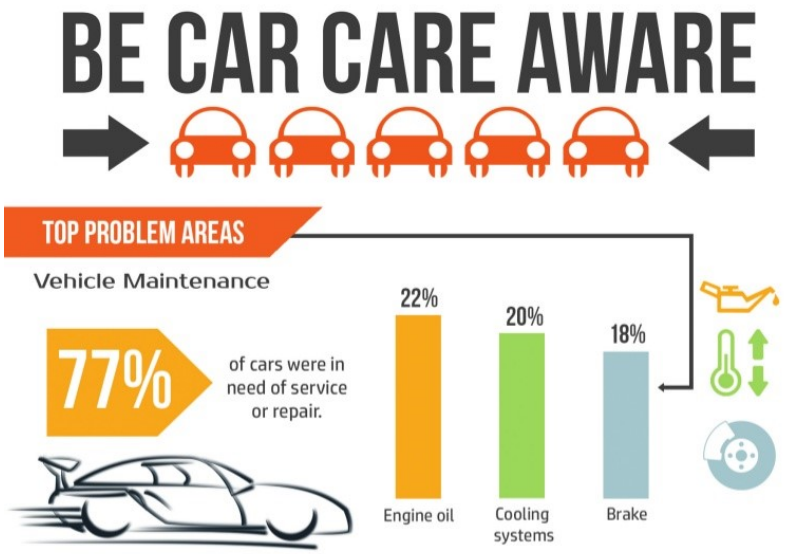
Some practices to reduce air pollution emissions and improve fuel efficiency are:

-Inflate and align your tires properly

-Replace clogged air filters

-Use the recommended grade of motor oil

-Schedule regular tune-ups. Regular engine tune-ups and car maintenance checks decrease problems due to worn spark plugs, low transmission fluid or transmission problems. When your average fuel efficiency falls by 10 to 15 percent, it is time to schedule a tune-up. Check your owner's manual for tune-up guidance.



Vehicle Emissions Inspection

Emissions inspections are required in 20 counties in North Carolina. This test is included in the annual safety inspection. The goal of the emissions test is to make sure that the internal systems are functioning properly and will alert the driver so that the vehicle can be taken in for maintenance before more serious problems occur.

Vehicles registered in the following counties must undergo this on-board diagnostic emissions inspection in order to maintain air quality standards in compliance with U.S. Environmental Protection Agency guidelines:

Alamance	Guilford
Buncombe	Johnston
Cabarrus	Lee
Cumberland	Lincoln
Davidson	Mecklenburg
Durham	New Hanover
Forsyth	Randolph
Franklin	Rowan
Gaston	Wake

Vehicles exempt from emissions inspections include:

- Vehicles within the three most recent model years that also have less than 70,000 miles on the odometer
- Vehicles manufactured prior to 1995
- Diesel-operated vehicles
- Vehicles registered as farm equipment

Vehicle Safety Inspection

In North Carolina, motor vehicles must pass an annual safety inspection before they can be registered or have the registration renewed. During the inspection, in order to assure proper working condition, a licensed mechanic examines a vehicle's:

- Headlights
- Accessory lights
- Directional signals
- Foot brake
- Parking brake
- Steering
- Windshield wipers
  Tinted windows, if applicable

The Way You Drive

Even a properly maintained car will pollute more if it is driven carelessly. Eco-friendly driving techniques can help you to reduce emissions and save money on fuel and maintenance costs.

Idling. Idling is when your car is running but you are not moving, such as in traffic, at a red light, or in a long line at the drive through. Many people wrongly believe that it is more fuel efficient and better for the car to idle rather than to turn off and restart the vehicle. In fact, over 30 seconds of idling uses more fuel than restarting the car. As a rule of thumb, if you are going to be idling more than 30 seconds – except for in traffic – turn off the engine. When you leave your internal combustion vehicle running while it is not moving, the engine is not operating optimally. With modern engine technology, frequent restarting has no effect on the engine and its components.

Stop and Go Driving. Hard acceleration and breaking can waste fuel and lower fuel efficiency. Try to accelerate and decelerate slowly at traffic signs and lights, etc. Another way to reduce this type of driving is to avoid driving in heavily trafficked areas and during rush hour.

Driving the Speed Limit. Studies by the U.S. Department of Energy show that for every 5 miles you drive over 60 miles an hour, fuel efficiency will go down by 7%. You can also lower emissions and increase fuel efficiency by using overdrive and cruise control when you are travelling at a constant speed.

Heavy Loads. Your car will burn more fuel and emit more air pollution when the engine is operating under heavy loads. This can be prevented by keeping the extra weight in your car to a minimum – this includes unnecessary items in your backseat and trunk.

Refueling. Gasoline vapors are toxic to breathe. Be careful to avoid spills and overfills at the gas station when refueling your car. Topping off your tank is a waste of money because that gas does not go into your tank, rather it goes back into the gasoline pump because of the car's overflow safety features.

Alternatives to Driving

Ultimately, the best way to reduce emissions from your vehicle is to drive it less. Traffic trends indicate that passenger traffic is doubling every 20 years. Methods such as combining trips, carpooling, using driving alternatives such as walking or biking, and taking public transit can help you to significantly reduce your vehicle emissions.

Combining Trips

One of the simplest ways to reduce your vehicle emissions and save fuel is to combine multiple errands or tasks into one trip rather than making many small trips. Plan to do several tasks in a single driving trip. For even more savings, you can park in a central location and walk between nearby locations.

Carpooling

Ridesharing is becoming increasingly popular as commuters are becoming more aware of the impact their driving has on air pollution. Many drivers participate in carpooling and vanpooling because they are relieved of the burden of driving while being able to interact with friends and coworkers. Other benefits of carpooling include saving money on fuel costs and reducing wear on your personal vehicle.

Many employers and universities have incentive programs that encourage employees and students to participate in carpooling in order to meet their sustainability goals. There are also many city and private programs that will promote ridesharing.

For more information about ridesharing, public transit, and other alternative commuting options, check out our Commuter Options webpage at : https://deq.nc.gov/about/divisions/air-quality/air-quality-outreach/air-quality-public-involvement/air-awareness/commuter-options

Walking/Biking

Walking and biking are not just for recreation at your local park; these activities help to reduce emissions and traffic congestion. Many municipalities have walking trails that lead to different areas of town while also giving citizens access to green spaces. Scientific studies show that exposure to nature and greenspaces is positively associated with numerous aspects of health and good social relations. Exposure to natural scenery, even though a window or a photograph has been shown to slow heart rate and calm anxiety.

Public Transportation

You can save over $9,641 a year[6] in avoided gas, maintenance, parking, and other expenses *and* reduce your air pollution by taking public transportation rather than a personal vehicle.

By moving a large number of people more efficiently, public transit produces less air pollution per passenger mile than a standard single occupancy vehicle. Buses emit 20% less carbon monoxide, 10% less hydrocarbons, and 75% less nitrogen oxides per passenger mile than single occupancy vehicles. With so many people on one vehicle, public transportation reduces traffic congestion, while getting everyone to their intended destinations faster.

Taking public transit can also free up a significant amount of time to read, work, study, or catch up on social media without the hazards of distracted driving.

No matter the destination or duration, even an occasional carpool, walk, or bus ride can make a significant difference in your local air quality.

[6]https://cleantechnica.com/2016/11/29/9641-annual-savings-taking-public-transportation-usa/

To learn more about air quality in North Carolina and clean driving practices, join us online at itsourair.org

N.C. Air Awareness

N.C. Air Awareness is a public outreach and education program of the North Carolina Division of Air Quality (DAQ). The goal of the program is to reduce air pollution from cars and trucks though voluntary actions. In addition, the program aims to inform the public of ways to minimize production of air pollutants from cars and trucks to improve air quality over time

N. C. Division of Air Quality

The Division of Air Quality (DAQ) works with the state's citizens to protect and improve outdoor, or ambient, air quality in North Carolina for the health, benefit and economic well-being of all. To carry out this mission, the DAQ operates a statewide air quality monitoring network to measure the level of pollutants in the outdoor air, develops and implements plans to meet future air quality initiatives, assures compliance with air quality rules, and educates, informs and assists the public with regard to air quality issues.

N.C. Department of Environmental Quality

"Providing Science-Based Environmental Stewardship for the Health and Prosperity of all North Carolinians"

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